

One Million-plus Gallon Drop in the Lake

Dave Lochbaum

April 2022



On Christmas Day 1993, Fermi 2 in Newport, Michigan was operating at 93 percent power.

The reactor's output had been limited since early 1993 due to elevated turbine vibrations.

Vibrations tend to get worse, not better, over time. They very seldom fix themselves.



Fermi 2 had shut down for refueling in September 1992. The turbine vendor recommended that blades in Low Pressure Turbine No. 3 be replaced during the outage, but the owner opted not to replace them.



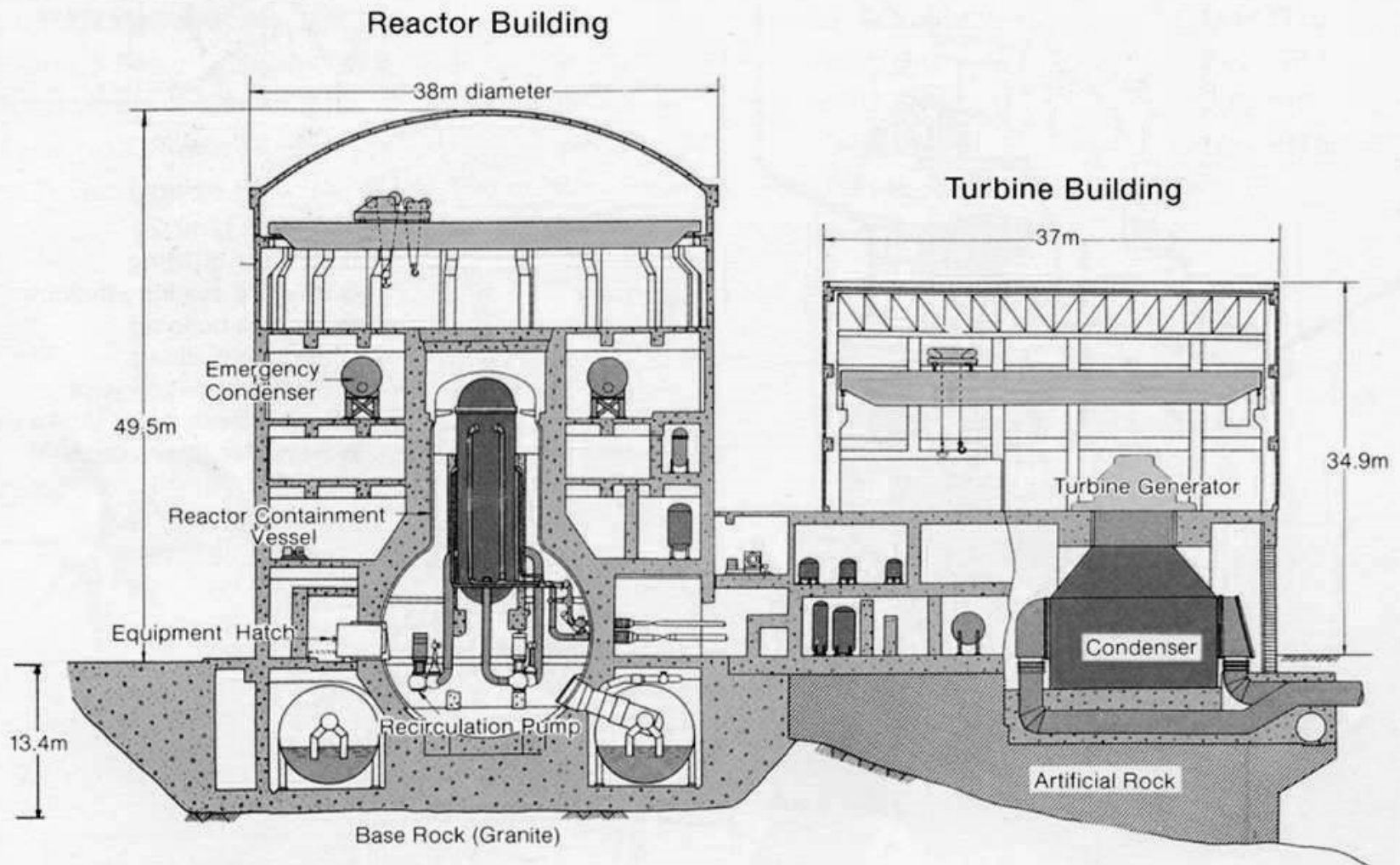
At 1:15 pm on Christmas Day 1993, the reactor and turbine automatically shut down. The turbine had literally shaken itself apart.

The turbine consisted of a high pressure and three low pressure sections on the same shaft which also connected to the main generator.



Metal blades in Low Pressure Turbine No. 3 had broken loose. The turbine, spinning at 1,800 revolutions per minute (30 times per second), launched fragments which ripped through the metal casing surrounding the turbine and tore through piping of two nearby cooling water systems and through tubes in the condenser below the turbine.

The fire suppression system in the turbine building also actuated due to the released steam and a small fire the flying parts started.



An estimated 500,000 gallons of water flooded the basements of the turbine and radwaste buildings. Another 531,840 gallons of radioactively contaminated water unsuitable for re-use in the plant filled the Condensate Storage Tank. What to do with over 1 million gallons of water?

Nuclear Power Plants in Michigan



One million gallons of radioactively contaminated water unsuitable for re-use in a plant located right next to Lake Erie.

What to do with all this water?

- GOVERNMENTAL AFFAIRS, CHAIRMAN
- ARMED SERVICES
- SELECT COMMITTEE ON INTELLIGENCE
- SPECIAL COMMITTEE ON AGING

United States Senate

WASHINGTON, DC 20510-3501

February 16, 1994

Ivan Selin
Chairman
Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Dear Chairman Selin:

It has come to our attention that contaminated water from the Fermi 2 nuclear power plant in Newport, MI, may soon be discharged into Lake Erie.

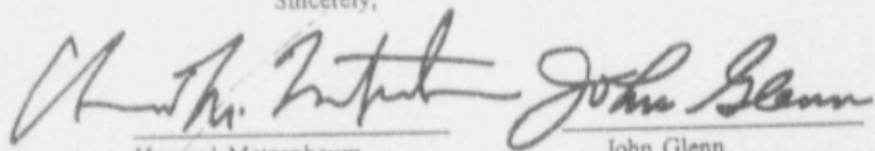
While we understand that the NRC has verified that the proposed discharge is below NRC radiation exposure limits, we want to ensure that there will be no adverse impacts on the health of Ohioans and their environment.

We understand that the Detroit Edison Co. has agreed to delay the planned release of the contaminated water, and that a public meeting has been scheduled for Wednesday, February 23, to determine any unresolved questions surrounding the discharge. We expect that the NRC will be present at this meeting to ensure all applicable standards and procedures are followed.

In the event that the release of the contaminated water moves forward, we expect the NRC to monitor each discharge as it happens to ensure the discharge remains below harmful levels. Therefore, we would like you to assure us and the citizens of Ohio that an adequate determination has been made that these discharges pose no risk to environmental health and safety around Lake Erie.

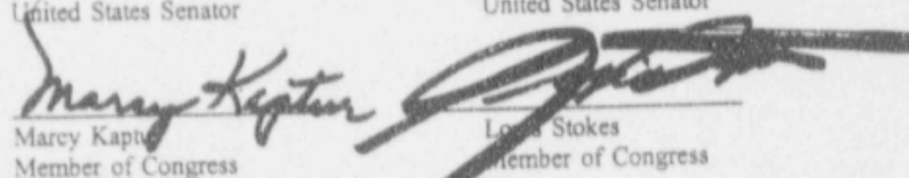
Thank you for your assistance with this matter.

Sincerely,



Howard Metzenbaum
United States Senator

John Glenn
United States Senator



Marcy Kaptel
Member of Congress

Louis Stokes
Member of Congress

The Ohio Congressional delegation suspected where the water might go and conveyed their concerns to the NRC Chairman.

Source: ML20064L787

The Sisters, Servants of the Immaculate Heart of Mary conveyed their concerns to the NRC Chairman.



SISTERS, SERVANTS OF THE IMMACULATE HEART OF MARY
810 West Elm Avenue • Monroe, Michigan 48161 • 313-241-0012 • FAX 313-487-1800

February 16, 1994

Ivan Selin
Chairperson, Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Selin:

Detroit Edison, operator of the Fermi II nuclear plant in Monroe, Michigan, is planning to release 1.5 million gallons of water tainted with radioactivity into Lake Erie on Thursday, February 17, 1994. The release will take place three miles from the inlet that provides tap water for the city of Monroe.

The water to be released is part of the clean-up from the December 25, 1993 accident at Fermi II. I have grave concerns about the level of radioactivity in the water, and about its long-term health effects on the citizens of Monroe. The ingestion of even low levels of radioactivity, although declared "safe" by Detroit Edison, pose a potentially dangerous threat to the community and put the public here at risk.

I am asking that the NRC move quickly to forestall the release of this tainted water until:

- assurances can be given to the citizens of Monroe and the surrounding areas that their long-term health will not be threatened by ingestion of this water;
- Detroit Edison releases to the public the exact amount of radioactive content in the water and that their assessment of the amount is verified by an independent agency who declares it "safe";
- Detroit Edison gives full disclosure of the cause of the accident and publicly announces their plans to rectify the damage resulting from the accident in an ecologically safe manner;
- safety precautions at Fermi II are upgraded and their emergency plan is made public.

I also urge that your department move forward to support studies to document the health risks associated with long-term exposure to ingestion of low levels of radiation and that the results of those studies be made public as soon as possible.

I appreciate what you have done recently to de-classify and release documents relating to nuclear testing on U.S. citizens. I sincerely hope that you will help to safeguard the citizens of Southeastern Michigan by intervening before this water is released tomorrow.

Sincerely,

Dorothy McDaniel III
President of the Congregation

JOHN D. DINGELL
16TH DISTRICT MICHIGAN

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COMMERCE

CHAIRMAN

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MIGRATORY BIRD
CONSERVATION COMMISSION

Congress of the United States

House of Representatives

Washington, DC 20515-2216

February 17, 1994

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Dr. Ivan Selin
Chairman
Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, Maryland 20852

Dear Chairman Selin:

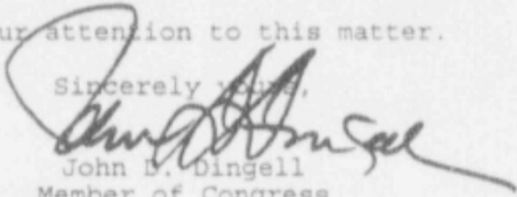
I understand that Detroit Edison Company plans to discharge into Lake Erie up to 1.5 million gallons of water that has a certain level of radioactivity. As you know, the water will be released a mile from the inlet that provides tap water for the City of Monroe. As a result, I remain concerned that this release of water meets all applicable standards under the law governing the release of liquids containing nuclear material.

I understand that this release has the prior approval of the Nuclear Regulatory Commission (NRC) and that in advance of the decision to release this water, the NRC made a determination that the radioactivity in the water will not exceed the levels permissible by law. I also understand that the NRC intends to monitor the release of this water at the point of discharge and at all water intake points at the time of the release. Please provide me with the results of NRC monitoring and testing efforts when they are completed, and with the documentation on which the Commission based its decision that these releases would not adversely affect the health and safety of the surrounding community.

An agreement was reached on February 17, 1994 between local government officials, members of the community, and Detroit Edison Company that the State Health Department will independently review and test the radioactivity of the planned release. The results of the Health Department review will be discussed in a meeting planned for Wednesday of next week. Detroit Edison Company has agreed to wait until the results of that review to release the water. It would be useful and appropriate for NRC staff to be present at that meeting and I respectfully request that you assist in ensuring attendance.

Thank you for your attention to this matter.

Sincerely yours,

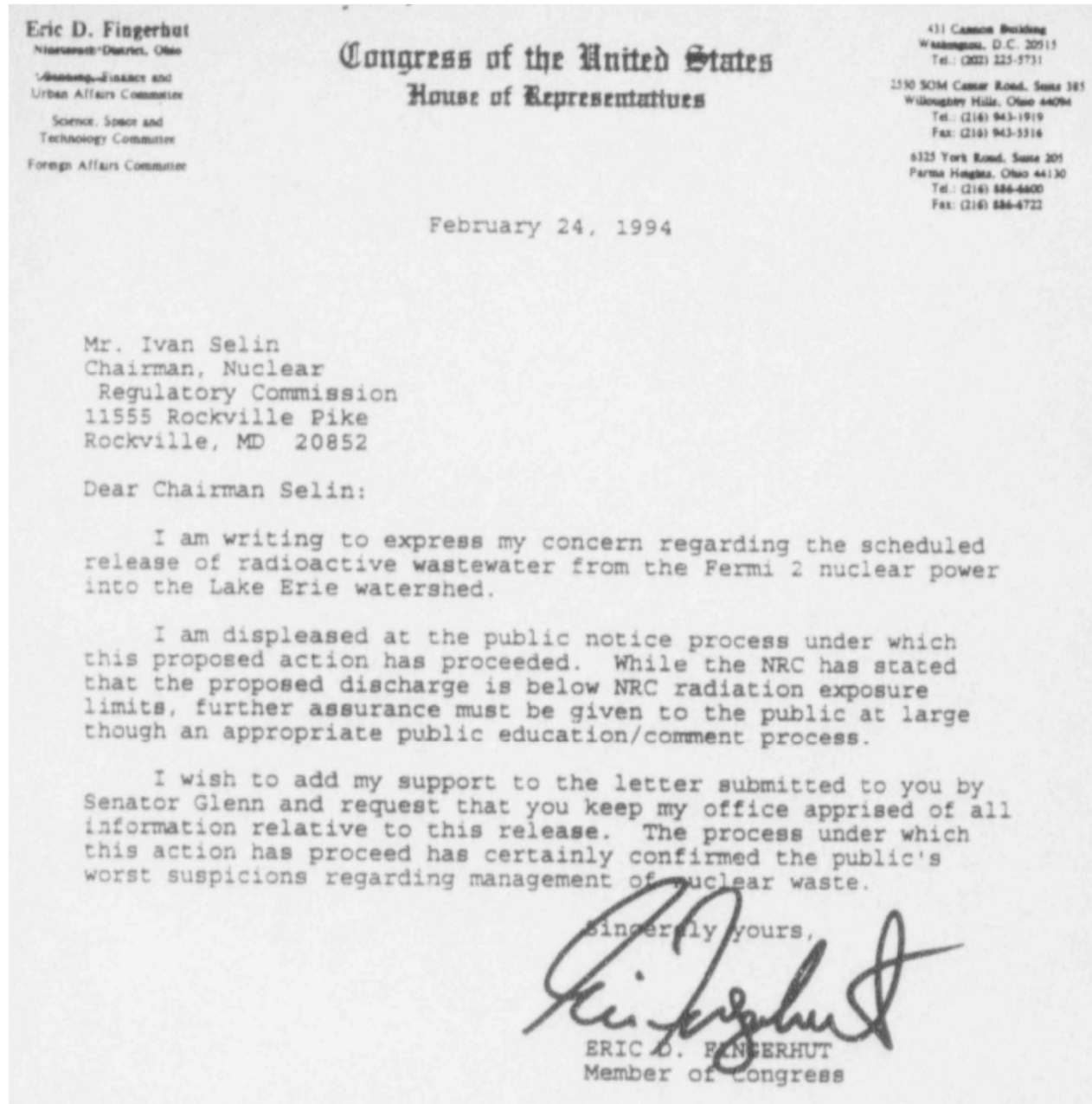

John D. Dingell
Member of Congress

**The Chairman of the
House Committee on
Energy and Commerce
conveyed his concerns
to the NRC Chairman.**

Source: ML20064N463

**Rep. Fingerhut of Ohio
conveyed his concerns
to the NRC Chairman.**

**To avoid further
repetition, suffice it to
remark that lots of
people expressed lots
of concern about
contaminated water
being discharged into
Lake Erie.**





UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

March 18, 1994

The Honorable John Glenn
United States Senate
Washington, D.C. 20510

Dear Senator Glenn:

On behalf of the Commission, I am responding to your letter of February 16, 1994, regarding planned discharges of slightly contaminated water from the Fermi 2 nuclear plant into Lake Erie. We want to assure you that the discharges meet regulatory limits for release and that the NRC is monitoring actual discharges to ensure that the public's health and safety are protected.

With regard to the February 23, 1994 public meeting in Monroe, Michigan, that you reference in your letter, several members of the NRC Region III and headquarters staffs were in attendance, including Mr. William Axelson, Director, Division of Radiation Safety and Safeguards (DRSS), Region III; Mr. Steven Orth, DRSS, Region III; Mr. Roland Lickus, Region III State Liaison Officer; Mr. Jan Strasma, Region III Senior Public Affairs Officer; and Mr. Charles Willis, NRC headquarters DRSS representative. Their function was to assist in providing information to address public questions concerning the proposed discharge.

Additionally, the staff confirmed by independent measurement preceding the first discharge that the radioactivity levels of the water in the condensate storage tank were well below the regulatory limits for release and that these results agreed with licensee and State of Michigan sample results. The results indicated that the concentrations of all radionuclides in the tank were small fractions of the 10 CFR Part 20 limits for release to unrestricted areas.

The staff monitored the actual discharge at the release point and local intake point (city of Monroe water intake) to verify that the levels remained within regulatory limits. Samples were taken at each location during and following the discharge, five at the release point and eleven at the intake. For all samples, the results indicated less than the minimum detectable activity level for each radionuclide of concern. The staff also calculated expected exposures to the general public from the normal ingestion pathway, such as drinking Monroe city water and eating fish from Lake Erie over the course of a year. In all cases, the expected doses represented very small fractions (less than 0.1 percent) of the equivalent amount of radiation expected annually from naturally occurring background sources.

These measures verified that the releases did not pose a risk to the public health and safety or to the environment. The staff plans to perform additional confirmatory analysis of representative samples from future discharges related to the December 25, 1993 incident. These sampling plans will be coordinated with city, county, and state officials prior to any future releases of contaminated water.

We will be pleased to send you a copy of our completed inspection report documenting the results of this and future discharges when published. If I can be of any further assistance, please let me know.

Sincerely,

Ivan Selin

By letter dated March 18, 1994, the NRC Chairman responded to Senator Glenn. Similar letters on or about that date were mailed to others who had written the Chairman of their concerns.

By that time, nearly one million gallons of radioactively contaminated water had been discharged from Fermi 2 into Lake Erie.

Source: ML20064L779

At 7:21 pm on February 24, 1994, Fermi 2 began releasing radioactively contaminated water from the Condensate Storage Tank to Lake Erie. At 7:04 pm on February 25, 1994, the release was terminated after an estimated 480,528 gallons had been discharged.

Source: ML20093N100

At 8:15 pm on March 15, 1994, Fermi 2 began releasing radioactively contaminated water from the Condensate Storage Tank to Lake Erie. On March 16, 1994, the release was terminated after an estimated 500,000 gallons had been discharged.

Source: ML20065K540

In March 1994, Fermi 2 released an estimated 557,000 gallons of radioactively contaminated water from the Condensate Storage Tank to Lake Erie.

Source: ML20087G208

These three discharges from the Condensate Storage Tank to Lake Erie were the only radioactively contaminated water released from Fermi 2 during 1994.

Based on conservative assumptions for consumption of water and fish from Lake Erie from NRC Regulatory Guide 1.109, the maximum radiation dose to the total body of a member of the public from these liquid releases was calculated to be 0.0644 millirem.

The federal limit from 10 CFR Part 20 on dose to a member of the public from liquid releases is 3 millirem per year.

The calculated total body dose to the public from the release of nearly 1.5 million gallons of radioactively contaminated water from Fermi 2 during 1994 was 2.15 percent of the allowable federal limit.